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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

November 20, 1937

Researchers

See Page 323

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

Vol. 32 *No. 867*

The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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DO YOU KNOW?

About 1,200 different minerals are known.

Television cameras, to be tried in England, are several times more sensitive than those previously used.

In the past year, the U. S. Board of Geographic Names has decided over 400 cases involving the accuracy or suitability of place names.

To tempt alligators to eat, zoo caretakers sometimes have to dangle a fish before their noses, so they can fancy themselves catching it.

Since coal is a chemical raw material, and may vary in its properties, the U. S. Bureau of Mines is endeavoring to list all the kinds available in America.

Pictures of bullets striking armor plates have been made in Germany by a photographic process that takes 250,000 exposures a second, and the rate of a million, or possibly ten million exposures a second is foreseen.

In recent British demonstrations of water-repellant fabrics, models dressed in the materials spilt tea and lemonade on one another, and calmly shook their skirts, while the drops rolled off leaving no mark.

Some kinds of glass turn violet if exposed only a few years to desert sun.

Women of ancient Egypt had a fashion of painting fingernails and toenails red.

The International Pacific Highway will eventually link Fairbanks, Alaska, with Buenos Aires.

Siam's 13 million people have heretofore been rated about 90 per cent. illiterate, but compulsory education is reducing the figure.

America's famous Statue of Liberty is nearly 50 feet taller than the Colossus of Rhodes—one of the ancient world's seven wonders.

A giant searchlight 18 feet in diameter, displayed at the Paris Exposition, is to become the beacon of a lighthouse on the Brittany coast.

Scientists in Hawaii are determining the depths of fresh and salt water zones underground there, by measuring the electrical conductivity of the ground.

Swedish scientists have evidence that northern Scandinavia is gradually rising, about four-tenths of an inch a year, as the land tilts from north to south.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

BACTERIOLOGY

Is an ink-like stain a potent weapon in the battle against a dreaded childhood disease? p. 327.

ENGINEERING

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GENERAL SCIENCE

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What practical application has the discovery that electrons act like light waves? p. 323.

GEOLOGY

Can continents be lost and found again? p. 330.

MEDICINE

Can a vaccine be used to prevent pneumonia? p. 324.

For how long have clinics offered treatment of tuberculosis? p. 328.

Is the battle against rheumatic heart disease financed with a large sum? p. 333.

What sort of diet prevents colds? p. 328.

PALEONTOLOGY

What was a creature as long as a house is wide but only four feet tall? p. 328.

PHYSICS

How high can a searchlight shine? p. 328.

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PHYSIOLOGY

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PSYCHOLOGY

Can a chimpanzee learn to take his medicine? p. 329.

ZOOLOGY

How powerful is the shock of an electric eel? p. 328.

GENERAL SCIENCE

Nobel Prizes Are Awarded In Physics, Chemistry, Medicine

One American, Dr. C. J. Davisson, Among Those Who Are Honored; Others Are English, Swiss, Hungarian

See Front Cover

A DECADE ago two physicists, one an American, Dr. C. J. Davisson of Bell Telephone Laboratories, the other Prof. G. P. Thomson of Imperial College, London, discovered that electrons, the basic and smallest particles of matter, act like waves of light or X-rays.

They showed that crystals scatter them. They confirmed experimentally the theory of wave mechanics that won for Prince Louis Victor de Broglie the Nobel laureate in physics in 1929.

This year's Nobel prize in physics is shared by Davisson and Thomson, a world acclaimed honor worth to each of them about $20,000 in cash and much more in prestige.

Today this diffraction of electrons is being put to practical use. As a tool of science it compares, in its field, with X-ray analysis. X-ray diffractions by crystals are powerful tools to probe the depths of metals and other crystals. The special merit of electron diffraction is the analysis of the surface of crystals and the structure of very thin films of materials. X-rays are useless for such surface and thin film studies. They are so piercing that they go right through the sample without disclosing sought-for information. Electrons—far less piercing—are stopped, scattered and reflected by crystal surfaces and thin films and thus are vitally useful for this type of research.

Only a few weeks ago it was suggested that the methods of electron diffraction might well be used as a potent tool for biological research in studying the very thin films which separate cells of the animal and human body.

Quite independently the two new Nobelists made the same discovery in 1927. Dr. Davisson, who worked jointly with Dr. L. H. Germer, found high speed electrons were scattered by a crystal of nickel. Prof. Thomson, then at the University of Aberdeen, shot low-speed electrons through a screen composed of a film of pure gold, far thinner than the sheerest gold leaf. Drs. Davisson and Germer published first. Drs. Davisson and Germer are shown on the front cover.

Prof. Thomson is son of Sir J. J. Thomson, famous dean of British physicists who in 1906 won the Nobel prize in physics, and who in 1897, just 30 years before his son showed the electron was wave-like, discovered the electron itself, one of the greatest discoveries of all time.

Prof. Thomson was only 35 years old and Dr. Davisson was 46 when they made their discoveries in 1927.

Interviewed over long-distance telephone, Dr. Davisson with scientific caution said that he really should "wait until official notification" before commenting on his honor. He hoped the press would make mention of Dr. Germer's participation in the discovery. And he emphasized the practical application today of what a decade ago was just the demonstration of an interesting phenomenon.

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CHEMISTRY

Chemistry Award Goes To Karrer and Haworth

THE 1937 Nobel award in chemistry is shared by Prof. Paul Karrer of the University of Zurich, Switzerland, and Prof. W. N. Haworth of Birmingham University in England.

Prof. Karrer worked out the chemical formula for vitamin A, the growth vitamin found in cod liver oil, butter, carrots and other yellow-colored foods. This vitamin, Prof. Karrer subsequently discovered, is closely related to ionone, the basic material of all violet perfumes. Turning his attention to the next vitamin in the alphabet, Prof. Karrer worked out the formula for vitamin B_2, sometimes called the appetite vitamin because of its appetite-stimulating quality. Under Prof. Karrer's direction a pharmaceutical supply house was able to make synthetic vitamin B_2. American physicians had a chance to see the sixty grains of brownish crystals which then constituted the entire world's supply of this synthetic vitamin at the 1935 meeting of the American Medical Association.

Research on vitamin C, the scurvy-preventive, and on the class of chemicals known as carbohydrates, which comprise sugars and starches, was the basis for Prof. Haworth's sharing the Nobel Prize award. A chain of glucose units, arranged as rings, he discovered, make up the cellulose molecule. Cellulose is the principal constituent of wood, cotton, flax and other textiles.

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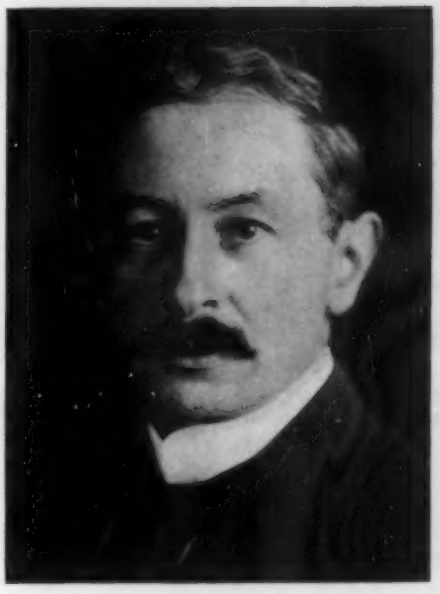

PROF. PAUL KARRER

One of those honored with Nobel Prize in Chemistry.

MEDICINE

Medical Nobelist Found Anti-Diabetes Chemical

THE 1937 Nobel prize in physiology and medicine award to Prof. Albert Szent-Gyoergyi, noted biochemist of Francis Joseph University, Szeged, Hungary, will undoubtedly win wide approval in scientific circles because he had been at the forefront of research upon the chemical constitution of the vitamins and other organic chemicals concerned in health and disease.

The award was made "for his discovery of the biological processes of oxidation with special regard to vitamin C and the fumaric acid catalyses."

He was the first to obtain vitamin C or ascorbic acid, as it is known chemically, in crystalline form. Vitamin C is the preventive of scurvy. Only this year he reported the discovery of a new vitamin, christened with the letter P, which is closely related to vitamin C and, like it, is found in lemons and paprika.

A new way of treating diabetes may result from another of Prof. Szent-Gy-

oergyi's researches announced only four months ago. This may allow treatment of the disease by mouth instead of by injection. He found that a long known drug, succinic acid, has the power to combat the acidosis condition which is the dangerous end result of diabetes. The new drug promises to aid diabetics who do not respond completely to the now standard insulin treatment.

Fumaric acid mentioned in the official citation for the Nobel award is used in making the succinic acid.

The award to Prof. Szent-Gyoergyi is a cash prize of some $40,000, which will be presented in December.

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MEDICINE

Anti-Pneumonia Vaccine Being Distributed to C.C.C. Camps

A VACCINE for preventing pneumonia, being prepared at the Army Medical School, Washington, D. C., is now being distributed to C.C.C. camps throughout the country. Young men at the camps will be given shots of the vaccine, which it is believed will protect them during the coming winter against the disease which ranks third as a cause of death among all diseases.

The vaccine, originally developed by Dr. Lloyd Felton of the Johns Hopkins University, will not be available to the public for probably two or three years. It will take at least that long to determine, by experience with it in the C.C.C. camps and elsewhere, whether or not it is an effective preventive.

Final decision will be based on comparison between the number of cases of pneumonia, if any, that develop among the vaccinated men with the number of cases developing among the unvaccinated. Since the number in the latter group may be small anyway, it will be necessary to wait until figures on thousands of cases in each group are available for comparison. Last year 25,000 men at C.C.C. camps were vaccinated, but that is considered too small a number for drawing conclusions.

Best method of protection against pneumonia now available to the general public is to avoid colds and influenza. Four-fifths of all cases of pneumonia start from a cold or influenza, experienced physicians estimate. Although it may not be possible to avoid colds and influenza, they can in many cases be kept from ending with pneumonia if proper care is taken.

Another important point in pneumonia prevention is the isolation of pneumonia patients as early as possible, so their germs cannot spread to well persons. For this reason and for the protection of the patient himself, a doctor should be called at the first suspicion of pneumonia.

The usual autumn rise in influenza cases has already started, reports to the U. S. Public Health Service show. The increase, however, has not yet reached the stage of suggesting that there will be an epidemic. It does show that it is time to take precautions against colds, influenza and pneumonia.

Pneumonia is caused by a tiny germ called the pneumococcus. There are 32 types of these germs, each causing a separate type of disease. Fortunately there are curative serums available for at least five of these pneumonias—Types I, II, V, VII and VIII. If universally and reasonably adequate applications of serum treatment were made, nearly half the deaths from pneumonia could be prevented.

Dr. Felton's vaccine protects against Type I and Type II pneumonia and perhaps against other types as well. Preparation of it is a very tedious task. At the Army Medical School pneumonia germs for vaccine production are being grown in 50-gallon batches. From each such batch about one-sixth to one-third of an ounce of vaccine is produced. The amount required for a shot of vaccine —and only one shot need be given for protection—is not very large. From one gram of vaccine, which is less than a thirtieth of an ounce by weight, 1,000 men can be vaccinated.

If the vaccine becomes available generally, it will probably be possible to obtain it for about $1 a shot.

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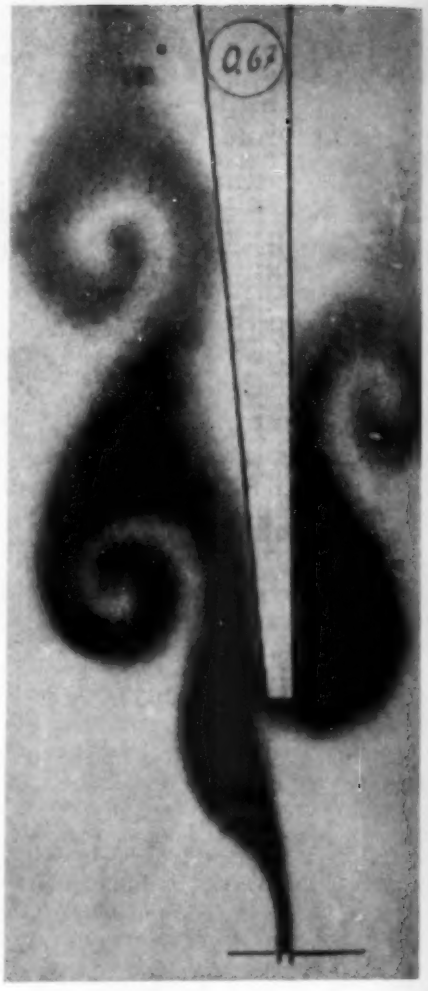
About 25 million elm trees shade the streets, yards and houses of America's villages and cities.

Houses built in Czechoslovakia are now required to have bomb-proof shelters provided in their cellars.



ARTISTIC SOUND

In artistic curls made visible by the addition of a small amount of smoke the eddies from an organ pipe swirl out. An illustration from the new book "Science and Music," by Sir James Jeans.

CHEMISTRY

Chemicals Added to Coal Fail To Aid Its Burning

CHEMICALS added to coal to make coal burn better have little effect on the combustion of fuel, the U. S. Bureau of Mines revealed at the conclusion of exhaustive tests.

Spurred by continual inquiries about alleged "fuel savers," the Bureau investigated, both alone and in mixtures, all the chemicals known to have been marketed for this purpose, and many others, including water and chlorine. None, it was stated, were found to produce the effects claimed for them.

Results of the experiments are contained in a bulletin by P. Nicholls, W. E. Rice, B. A. Landry and W. T. Reid.

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PHYSICS

Music May Have Scale Of 53 Notes, Predicts Jeans

Human Ear, Wearied With Old Harmonies, Demands New Notes at First Rejected, Then Tolerated, Liked

MUSICIANS of 1,000 years hence may be writing and playing their music on a scale which contains 53 notes to an octave, predicts Sir James Jeans, the noted British astronomer whose ability to turn scientific terms into the language of the layman has made the mysteries of the universe and the hearts of atoms enter the realm of non-fiction best sellers.

Sir James' newest book, "Science and Music" (Macmillan), predicts the 53-note scale for the distant future when all the possible combinations of the present 12 note scale have become boring to human ears.

But before that day comes, a day which will produce music better than the present, it may be expected that the music of the future will be like that of the present, but intensified. This has been the past history of music in which certain pleasing musical forms have been built up and persisted.

One tendency of music, says Sir James, has been the history of consecutive fifths. Harmonies which have seemed venturesome and even ugly to one generation seem natural and even beautiful to the next. And then through continuous use they become obvious and tedious to later generations. Just as popular swing music continually demands new "hit" tunes, so does "the sated ear forever demand new harmonies which it will fast learn to tolerate, and then dismiss as threadbare and uninteresting."

New Chords

Palestrina, J. S. Bach, Beethoven, Liszt, Wagner and Debussy are all examples of noted composers who broke new ground and introduced new chords that were considered discordant at first but which have now passed into the common language of music.

Sir James' scale of 53 notes enters in that distant day when it may be conceived that the human ear will find tolerable all the possible discordances which can be fashioned out of the present scale of 12 notes. In that day man will have only one other way to expand his musical horizon; by adding notes to the scale and thus splitting the octave into more and more parts.

Already, says the British scientist, there has been some experimentation with quarter tones. Enlargement of the scale has been progressive throughout musical history, he adds. First there was the pentatonic scale with five notes, then the heptatonic scale with seven notes and finally the chromatic scale of the present with its 12 notes.

"Has it reached," asks Sir James, "its final resting place in the 12-interval division of the octave, or will the subdivision still continue?"

"We have already seen that the question is one for the arithmetician. Without forgetting the proverbial dangers of prophecy, we may be fairly sure that the laws of arithmetic will not alter, and that the natural harmonics will not change their position—a million years hence, as now, their frequencies will be 2, 3, 4, . . . times that of the fundamental. And, unless the physiological quality of our ears changes appreciably, we may assume that we shall always obtain our basic pleasure from chords whose frequency ratios can be expressed by the smallest of numbers. Because of this, it seems likely that the present fifth, with the simplest frequency ratio of all, 3 : 2, and the major third, with the next simplest frequency ratio 5 : 4, will figure largely in the music of the future. Before we attempt a conjecture about the musical scale of the future, it is worth seeing how far the subdivision of the octave would have to be extended, to provide a scale richer and purer in this respect than our present scale."

The logical divisions of the octave to obtain the maximum amount of harmonious fifths and major thirds occur at 12, 41, 53 and 306 notes to the octave. The 12 note octave is now being used and the 41 note octave has some difficulties, so that the next choice falls at 53 notes to a musical octave.

"So far as is known, a 53-note scale was first proposed by Gerardus Mercator (1512-94), the famous Flemish mathematician, geographer and map-maker. In the middle of the last century, two harmoniums with 53 notes to the octave were built, one for Mr. R. H. M. Bosanquet of London, and one by Mr. J. P. White of Springfield, Mass., but neither seems to have been regarded as more than a curiosity," points out Sir James.

"We have already seen that the present 12-note scale has its roots embedded very deeply in the unalterable properties of numbers; we now find that music will have to go very far before finding a better scale. But a 53-note scale would give far purer harmonies than the present scale, and we can imagine future ages finding it worthy of adoption, in spite of all its added complexities—especially if mechanical devices replace human fingers in the performance of music. For, in the last resort, our limited scales have their origin in the limitations of our hands.

"Yet, if ever music becomes independent of the human hand, may not the race then elect to use a continuous scale in which every interval can be made perfect—as with the unaccompanied violin of today?"

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CHEMISTRY

Petroleum Chemists Told Of Need for Basic Research

RESEARCH in the chemistry of petroleum and its products has had to be rather higgledy-piggledy for a quarter of a century because the automobile industry has been a chronic Oliver Twist, holding out its dish and hungrily crying for "more." Research energies have had to be concentrated on meeting this terrific demand.

But now it is time to get down to real fundamentals of petroleum chemistry research, Dr. Harrison E. Howe, editor of Industrial and Engineering Chemistry, told the American Petroleum Institute. Thus far, petroleum chemists have been so busy as "oil cooks" that they have had time to find out the fundamental nature of only about ten per cent of the complex mixture that is crude oil. They need to work out the other ninety per cent of this basic knowledge, and then find out more about what the whole thing is good for.

"The petroleum industry owes its growth to research and the application of its results," Dr. Howe declared. "It must continue a research program, with adequate staffs of carefully-trained and chosen men giving their attention to expertly-chosen problems, if it would maintain its position."

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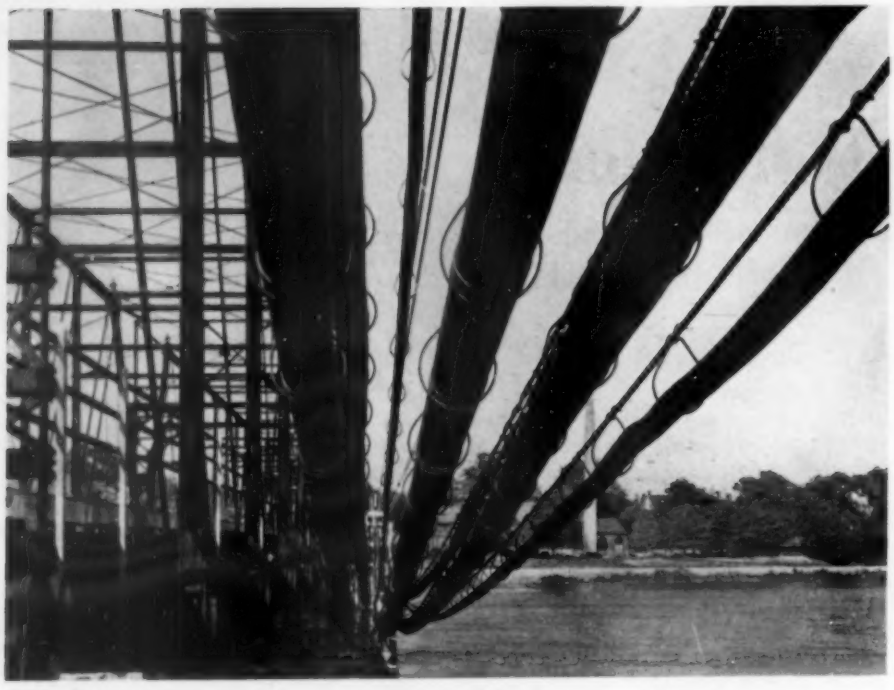

CARRIES MOVIES

The third of these cables, counting from the left, tiny in comparison with the others, can carry hundreds of telephone conversations or thousands of telegrams at one time.

ENGINEERING

Movies Transmitted by Wire In First Coaxial Cable Show

Really a Pipe Containing a Single Wire, It Can Do The Work of From 20 to 40 Pairs of Ordinary Wires

TELEVISION advanced one step nearer to becoming a commercial service as 240-line images were transmitted from New York to Philadelphia over the American Telephone and Telegraph Company's new million-cycle coaxial cable, which can carry at one time one 240-line television image, 240 wirephoto signals or telephone conversations, or 4,800 telegrams.

Using an eight-inch-square cathode-ray receiver in place of the older disk scanning receptors, animated diagrams describing the equipment were transmitted from New York City and received in Philadelphia with no important loss of detail. Flicker was notably decreased, and the images were only slightly colored.

Newsreels were transmitted from New York and could be watched from a distance of ten feet without severe eye strain. Details such as a tennis ball in motion could be followed in the received image.

Present at the demonstration were Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, where engineers have developed the coaxial cable from a theory to a working system, and Dr. Herbert E. Ives, director of electro-optical research, engineer in charge of television investigation.

Intended for use as a communication channel for any service—code, voice, or image—the coaxial cable is limited in carrying power only by the nature of the terminal equipment. New terminals are now planned to increase the band of a million cycles carried by the cable to a still greater figure.

Television images transmitted are far superior to those sent by the same engineers from Washington to New York in 1927, and somewhat better than those sent over the two-way system demonstrated in New York recently.

Employing single side band transmission, which doubles the possible number of lines that can be sent over a given channel, and utilizing the entire spectrum of frequencies, this million-cycle cable is capable of carrying only the 240-line images shown. A projected two-million-cycle system, capable of carrying 480-line images, would permit twice as much detail or double-sized images with the same detail.

Repeaters Every 10 Miles

Starting in New York, the signals are "repeated," or amplified, every ten miles, each repeater containing about as much equipment as an average radio receiver. Power for the repeaters is transmitted through the cable along with the signals, making the system independent of any local power source.

Special delay equalizers were designed by Bell Laboratories engineers to prevent distortion that would be caused by the different rate of travel of the different signal frequencies. While electrical signals theoretically travel with the speed of light, the cable and terminal mechanisms cause delays sufficient to distort an uncorrected image. The equalizers allow the various signals that start out together to arrive within a quarter of a millionth of a second of each other.

The principle of the coaxial cable has been known for many years, but only recently was machinery for manufacturing the cable developed. Previously its cost was prohibitive.

Literally a pipe, the coaxial cable consists of a single wire inside a metal tube. But the single wire in its tube can do the work of dozens of pairs of ordinary wires.

Early models of the cable were made by hand at a prohibitive cost, each spacer being strung on the central wire. Then an insulating tube was drawn over it, and finally an outer sheath of woven copper braid was pulled over the whole.

The cable's usefulness lies in the fact that it does the work of twenty to forty pairs of wires of the type now in use and that it does things which no standard wire can do. It will effect tremendous savings of materials and instruments.

Every long distance line, for example, has "repeaters" placed at regular intervals to amplify the current carrying a telephone or telegraphic message. Each line, carrying from six to twelve messages, requires its own repeater. One re-

peater on the coaxial cable, however, amplifies 240 telephone messages rather than a mere dozen.

The coaxial pipe owes its advantages to the fact that it can carry at the same time alternating currents of frequencies ranging from zero up to a million or more cycles per second. Ability to carry hundreds of different currents simultaneously has been translated by the communications engineer into the ability to carry hundreds of messages at the same time.

Although neither company is believed to be planning at present a New York to Philadelphia broadcasting hookup, both the Columbia Broadcasting System and the National Broadcasting Company plan to begin regular television broadcasts from New York early in 1938. These experimental "telecasts" will be receivable only in the metropolitan area. Should they expand the service, however, use of the coaxial cable will be required.

The ninety-mile cable between New York and Philadelphia was completed last spring, and preliminary telephone and telegraph transmission tests were then carried out. Terminal difficulties have, however, prevented its use for television purposes until now.

No one engineer, it is believed, can be credited with the development of the coaxial cable. Bell Telephone engineers as a group conducted the experiments leading toward its use.

Machinery for its manufacture was designed by the Western Electric Co., a Bell subsidiary. The installation was carried out by the American Telephone and Telegraph Co.

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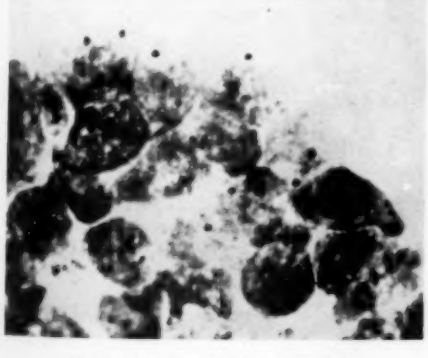
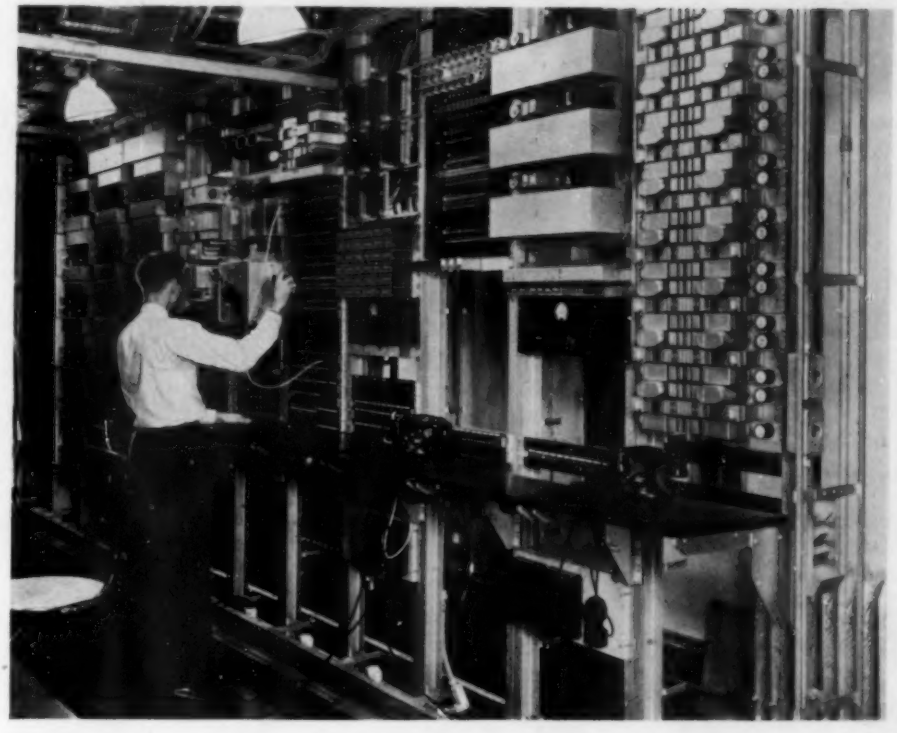


MEASLES VIRUS BODIES

A black stain shows the measles virus bodies as small dark spots. The large rounded bodies are cells of the nasal membranes which disintegrate under the virus' action, letting the virus escape, as seen in the margin, to reach other parts of the body or, via nasal discharge and saliva, to reach and infect another person. This remarkable photomicrograph is by T. H. Hausmann.



TERMINAL

The Coaxial cable is limited in carrying power only by the nature of the terminal equipment. Here is shown the elaborate apparatus at the Philadelphia terminal.

BACTERIOLOGY

Black Stain Makes Measles Virus Bodies Visible

Discovery Will Make Possible Early Treatment and Isolation of Patients; May Prevent the Epidemics

A BLACK, ink-like stain or dye may be the means of conquering measles, dreaded childhood disease, it appears from the discovery by Prof. Jean Broadhurst of Teachers College, Columbia University, announced by the University.

The dye is not a cure or preventive itself but it enables scientists for the first time to see under the microscope the hitherto invisible virus bodies which cause measles. As a result, the disease can be diagnosed 2 or 3 days earlier than is now possible, before the typical rash and fever appear, and the child can be isolated and kept from spreading the disease to others. Not only that, but healthy carriers of the disease virus can be detected and kept from spreading the disease which periodically sweeps the country in epidemics. Important also is the fact that the early diagnosis means treatment can be started early and this may save the child from mastoiditis, ear infections, pneumonia and other serious ails that commonly follow measles.

The dye is called Nigrosin. Its advantage over other dyes is that it colors the virus bodies but not the other germs that lurk in noses and throats.

Prof. Broadhurst's discovery was made with the assistance of Dr. Margaret Estelle McLean of the College and Vincent Saurino, a student. The experiments, aided by a grant from the Milbank Memorial Fund, included examination of mucus from the throats and noses of over 160 measles patients. Details are reported in the *Journal of Infectious Diseases*.

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MEDICINE

Less Sweets and Starches Believed to Reduce Colds

YOU may have fewer colds this winif you cut down on sugars and starches in your daily diet, it appears from a report by Frederick Hoelzel of the University of Chicago (*Science*, Oct. 29).

Observations by himself and various other investigators show that colds are fewer on such a diet and Mr. Hoelzel believes it is because the diet reduces the amount of fluid in the body tissues and this in turn reduces susceptibility to nose and throat infections.

If you think of applying this theory, it would be advisable to have the diet prescribed in detail by a physician so as not to run the danger of getting ill from a badly balanced or deficient diet.

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MEDICINE

First Tuberculosis Clinic Has Fiftieth Birthday

THE first clinic for the diagnosis, treatment, and control of tuberculosis was established just 50 years ago in Edinburgh by Sir Robert W. Philip. The importance of this anniversary can be measured all over the western world in lives and money saved and human misery avoided. The principles on which Sir Philip, then an unknown young physician, organized his clinic have served with very little change, the editor of the American Journal of Public Health points out, as the basis of all the efforts since then which have been effective in the fight against tuberculosis.

At the time this clinic, the Victoria Dispensary for Consumption, was established, it was known that tuberculosis was infectious, because Robert Koch had just recently isolated the bacillus that causes the disease. But little or nothing was known about how to apply this knowledge to the control of the dread disease. Tuberculosis, at that time the chief cause of death, was still taking 250 lives a year out of every 100,000 of the population.

The problem, as Sir Robert saw it, was that of getting patients to the physician in time for treatment to be effective. Also important was the need to find and bring under medical care the children and other members of the household in which a tuberculosis patient lived.

He established his clinic to serve as a center linking the various efforts being made to fight the disease. It was to have four functions. One of these was to receive patients for medical diagnosis. Another was to serve as a clearing house where all persons in close contact with patients could be observed and carefully examined. A third function was to investigate environmental conditions and to supervise the general care of households in which there was tuberculosis. The fourth function was that of furnishing information and propaganda.

Science News Letter, November 20, 1937

PALEONTOLOGY

"Horned Toad" Dinosaur Among Expedition Trophies

A "HORNED toad" dinosaur, a huge but squatty creature twenty feet long and five feet wide, with a height of only four feet, was among the fantastic discoveries made during the fossil-digging season just closed, by the American Museum - Sinclair Dinosaur Expedition under the leadership of Dr. Barnum Brown. Dr. Brown, who has just returned to New York, reported to his colleagues at the American Museum of Natural History.

Among the finds of hitherto unknown monsters of the ancient world are the skeleton of a gigantic duckbill dinosaur, apparently bigger even than the towering spike-toothed tyrannosaur that was the "tiger" of the dinosaurian jungles. There are also some new fossil footprints and a single armbone of the "Mystery Dinosaur" — a monster that stood 35 feet high and made footprints nearly a yard in diameter and 15 feet apart. A sandstone slab containing some of these terrific footprints is now on view at the Museum. (See SNL, July 31, for a photograph of this huge relic and description of a discovery it led to.)

Dr. Brown's finds were all made in a rock formation that has hitherto yielded nothing in the way of dinosaur remains, the Mesaverde Cretaceous, dating back some 80,000,000 years. The formation also yielded plant fossils showing a strange jungle of fossil plants, a mixture of palms, figs, poplars, willows and many other species.

Most of the digging was done on property of the Union Pacific Railroad. The company helped greatly by lending some of its heavy power excavating machinery, enabling the expedition to move masses of overlying debris in a few months that would have taken years to clear by ordinary shovel-and-wheelbarrow methods.

Science News Letter, November 20, 1937

IN SCIEN

ZOOLOGY

Yard-Long Electric Eel Can Deliver 500-Volt Shock

THERE IS nothing imaginary about the shock delivered by the electric eel, known to scientists as *Electrophorus electricus*. Even a baby eel, only eight inches long, can produce an electrical voltage equal to that used to run electric lights in the home—115 volts. And a yard-long eel has been found to develop 500 volts in its electric organ.

These results were reported at the symposium on biophysics held at the University of Pennsylvania by Prof. Robert T. Cox of New York University and Robert S. Mathews of the New York Aquarium. The scientists recently returned from Para, Brazil, where they had been on an expedition to study the electric eel in its native habitat.

They also found that the electrical discharge passed down the large electric organs of the eel with a speed of about 700 meters a second, or at the rate of about 1,800 miles an hour.

Science News Letter, November 20, 1937

PHYSICS

Searchlight Beam Spotted At Height of 20 Kilometers

DR. E. O. HULBURT, naval research laboratory expert, reported to the Optical Society of America that he was able to spot a searchlight beam 20 kilometers (about 12 1/2 miles) high in the air.

His camera went him one better, he declared, for the camera was able to spot the beam at a point 28 kilometers (nearly 19 miles) in the air.

Dr. Hulburt's method was simplicity itself. He knew how far away the searchlight was and the angle at which it was pointed. Simple geometry then told him how high the beam he was looking at directly overhead must be.

The air beacons seen by an airminded citizenry are much lower, Dr. Hulburt pointed out. Air beacons are deliberately aimed low so that once each time around they will shine directly at the approaching airplane pilot.

Science News Letter, November 20, 1937

ENE FIELDS

PHYSIOLOGY

Trout Spawning Hastened By Changing Length of Day

TROUT in hatcheries can be "ripened" to sexual maturity in far less time than the process takes in nature by artificial manipulation of their length of day. This makes possible a shortening of the ordinary spawning cycle, with consequent saving of time and therefore of cost and labor in getting the young fish ready for release into the streams.

Experiments in which this artificial control over the sex cycle of fish was established are reported in *Science* (Nov. 5) by Earl E. Hoover of the New Hampshire Fish and Game Department.

Mr. Hoover first lengthened the day of breeding trout by shining electric lights over the aquaria in which they were kept after the natural light of the short winter days had faded. This brought about an artificial midsummer light condition. Then the days were shortened by turning off the lights and shading the aquaria, each day a little earlier than the day before. This produced an artificial autumn.

The trout responded as they normally do in the fall, the females producing their quota of ripe eggs, while the males were ready with copious quantities of fertilizing milt.

Science News Letter, November 20, 1937

PSYCHOLOGY

Chimpanzees Are Trained To Take Their Medicine

ANY mother who has had a stormy session with Junior and the castor oil spoon will give generous sympathy to those who have struggled with the problem of giving medicine to apes.

The problem of giving drugs by mouth is considerably more difficult with the mature chimpanzee than it would be in the case of a strong man, determined to resist treatment, reports Dr. J. H. Elder, of the Yale Laboratories of Primate Biology, to the *Journal of Pharmacology and Experimental Therapeutics* (July, 1937).

It is no use to try to dress up the medicine with orange juice, either; the chimp is wary. Resort to force is generally useless—impossible for chimpanzees over six or seven years old.

Yet every once in a while it is necessary to give medicine or an anesthetic to one of these animals, and the ingenuity of the scientists at the Yale Laboratories has made it possible to secure the cooperation of the chimpanzees to such an extent that they have served as willing substitutes for humans in experiments on the effects of new drugs.

Most pitiful of the cases requiring anethesia is that of the mother ape who has lost her baby, but who clings tenaciously to her dead child, fighting dangerously any attempt to remove the body. For this situation and for the animal requiring dental examination, Dr. Elder has devised a portable air-tight chamber which can be placed over the animal and ether administered in much the same way that oxygen is given inside an oxygen tent. If other treatment is necessary, it can then be given during the resulting anesthesia.

It seems odd, but the chimpanzee who so vigorously resists medicine by mouth, can be trained in less than half an hour to accept the drug calmly by injection. This method has been so satisfactory that it has made possible the Yale Laboratories research studies on the psychological and physiological effects of new narcotic drugs.

Science News Letter, November 20, 1937

ENGINEERING

Carbon Dioxide Filled Daylight Lamps Perfected

CARBON dioxide filled incandescent lamps, providing an artificial daylight claimed to be a wide improvement over any previous type of artificial daylight lamp, have been commercially perfected, the Optical Society of America was told.

The lamp is suitable for matching colors, the test which has proved the undoing of most previous artificial lights, Dr. Thomas J. Killian of the Barkon Tube Lighting Corporation declared.

Previous attempts to use carbon dioxide in lamps, a long-sought goal because of its white spectrum, have failed because of the tendency of the gas to break down under the electric charge sent through it, with consequent changes in its pressure and behavior. A simple electronic control for the pressure is the new feature of the light, Dr. Killian asserted.

Science News Letter, November 20, 1937

ENGINEERING

Can Now Send Pictures By Dots-and-Dashes

A GERMAN inventor has been granted a U. S. patent on a system of transmitting photos over wires by dots-and-dashes.

Unlike the standard method of transmitting photos, the new system breaks a picture up into dots of various shades of gray and black, and converts the various shades into electrical impulses which are turned into dots-and-dashes for ordinary telegraphic transmission.

Siemens and Halske, internationally famous German engineering corporation, has been assigned the patent by Johannes Herrmann of Berlin-Siemensstadt, its inventor.

Telegraphic photo systems in use today send the electrical impulses into which a picture is broken up directly over the wires instead of converting them into dots and dashes first, as does the new method.

Science News Letter, November 20, 1937

SURGERY

Radical New Treatment For Thighbone Fractures

RADICAL change in the method of treating fractures of the head of the thighbone is promised by a direction-finder perfected by Dr. Gilson Colby Engel of Philadelphia, and described to the American College of Surgeons meeting in Chicago.

By this method the whole operation can be performed through a 1½ inch incision and completed in 20 minutes. The patient can move his leg at once, is up in a chair in 48 hours, and there is no shock from the operation, no cutting of muscles.

The device is formed of two plates in sector shape with a slotted center through which the nail is introduced over a Kirschner wire. When the nail is partly in, the fragments of bone are impacted with an impactor. A fluoroscope is used with the fracture reduced by means of the Leadbetter manipulation.

The incision is made to the bone and through its sheath (the periosteum). The apex of one plate is introduced into the incision with the plane parallel to the shaft of the thighbone and its point upwards. The pin is inserted and driven into the bone, fixing the plate in position.

Steps in the procedure are checked by X-ray.

Science News Letter, November 20, 1937

GEOLOGY

Vanished Lands

Stories of Mu and Atlantis, Lost Continents, May Be Myths, But Geologists Know of Many Lost Regions

By RONALD L. IVES

THE PRINCE of Atlantis, sitting sadly on the shore of Mexico, weeping for his vanished homeland, may be only a novelist's dream. Perhaps the homesick wanderings of the exiled children of Mu, after the foundering of their continent into the depths of the Pacific, never took place. Perhaps man never saw lost lands like these.

Vanished lands, however, are being discovered yearly by geologists. Deep under waters of the Atlantic are canyons that could hold the Grand Canyon of Arizona with room left over. Under the English channel is the valley of the ancestral Rhine. Deep in the Mediterranean sea is the ancient harbor of Tyre. Cities under the sea are not uncommon; and man has occupied the earth for only about 1/2500 of geologic time. Great lands were engulfed during the millions of years before man appeared on earth.

Atlantis, perhaps, was only a myth started by Plato, but recent studies by geologists suggest that at one time, probably 300,000,000 years ago or more, when the ancestors of our common toad were the highest forms of life, there were great land areas in what is now the Atlantic Ocean.

Measurements of the gravity of the ocean floor, conducted in recent years, have given us some surprising facts, which may be explained by the presence at some great depth under the ocean of a foundered land mass.

Down Warped

Recently, Dr. Richard N. Field, of Princeton University, suggested that under the Atlantic there may be "a vast area of downwarped Pre-Cambrian and Paleozoic geology," perhaps as complicated in structure as the upwarped structures of similar age (more than 300,000,000 years) on the continents.

The evidence for this vast "Atlantis" of bygone pre-human ages is not complete. Recent studies have supplied more facts, and more work is being done. Perhaps, if these suggestions are supported by later findings, we may find that some millions of years ago, instead of lemmings fleeing from central Europe into the sea, amphibians, similar to our modern toads, migrated from Europe to America!

American geologists, studying the rocks that now make up our Appalachian mountains, find that they must have been formed from materials eroded away from a mountainous land to the east—probably far to the east, in a place where the waters of the Atlantic now are. This land, called Appalachia by Charles Schuchert, eminent student of the lands of the past, may have been a part of the ancient and now submerged Atlantic Continent.

Lemuria, a hypothetical continent in the Indian Ocean, may have once existed. Long ago, geologists found that a land mass occupying parts of the Indian Ocean would explain the close geologic connection between India and Africa. The land mass wasn't there, so they assumed that it had foundered into the sea. Recently, an elevated portion of the sea bottom has been found on the exact location of this hypothetical continent. Is it the lost land of Lemuria?

Perhaps

Perhaps on this vanished continent man evolved from his lemur-like ancestor in the days before the cataclysm that sunk it. Here also, according to various theories, the plant and animal life of India and Africa crossed from one land to the other. Many theories, and a few facts, tell us that this continent may have existed, but today it is numbered among the missing.

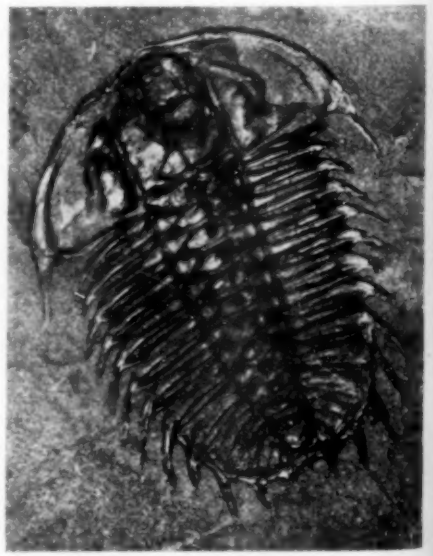
The Pacific, too, once swallowed a continent, according to various legends collected by the late Col. James Churchward, who wrote a number of books in an ineffectual effort to prove the former existence of the continent of Mu. Perhaps, from the mass of evidence collected by many workers, we may eventually find evidence, in the Pacific area, of a former chain of islands which furnished stepping stones by which ancient man crossed the Pacific. Mu, as a great continent, probably never existed, but islands in the Pacific do occasionally disappear. Only a few years ago, astronomers planned to observe an eclipse from little Sarah Ann island, and when they arrived at the site, with a shipload of telescopes and cameras, the island "showed up missing."

Perhaps the nearest thing to a reenactment of the mythical foundering of Atlantis occurred in the Cook Island Group, in 1836, when Tuanaki Island suddenly sank into the Pacific, with a loss of thousands of lives. Perhaps some of the legends of lost continents originated from a similar occurrence in the remote past.

Ruins Are Evidence

The ruins on Easter and other islands in the South Pacific have been used as evidence of a lost continent in that area. Now, with modern knowledge of the migrations of ancient races, and some ideas about the rising and falling of sea levels, it seems more probable that there never was, during man's occupancy of the earth, any really great interchange of land and sea. Relatively small areas have submerged, and similarly small areas have emerged from the sea, but the continental masses have not changed appreciably since the beginning of the Pleistocene ice age.

Continental masses have divided up during geologic time, and have sometimes been rejoined. Much that is now



TRILOBITE

Creatures like this lived 500,000,000 years ago and died in the mud of a sea that is no more.

DRIFT LOGS ON THE DESERT

They floated, 150,000,000 years ago, on the Jurassic Sea. Now they lie on the desert lands of Arizona.

land was once shallow sea, and some of our present seas were land areas at one time. Hudson Bay, in Canada, now a vast sea, was, until a few million years ago, an area of dry land. Perhaps the most interesting example of a land mass that has been sea bottom is the area known to geologists as Siouxia, and shown on ordinary maps as parts of Kansas, Nebraska, Colorado, New Mexico and Arizona.

Siouxia, during the time when life was just beginning on earth, was a part of the ancient North American Continent. Some 500,000,000 years ago, ancient North America foundered into the Paleozoic sea, leaving Siouxia as an island. Some millions of years later, a slight uplifting of the foundered land masses raised the little continent of Siouxia and joined it to the ancient continent of Canada.

Sank Again

Shortly after this, as geologists measure time, the lands sank again, leaving Siouxia an island continent, about one-third as large as Australia. After a few million years more, Siouxia was joined to another island continent, Mexicoia, by a slight lowering of the level of the ancient seas.

While the great reptiles were evolving from simpler forms, Siouxia was a land mass, sometimes a part of a vast southern continent, sometimes only a small island in a slimy sea. Part of it later became a mountain range, in the same location as our present Rocky Mountains. As the great dinosaurs reached their weirdest development, and became truly nightmare beings, little Siouxia foundered under waters of the Cretaceous sea, never to appear again as Siouxia.

America Emerged

As reptilian forms gave place to the warm-blooded mammals, lands all over the earth emerged from the sea, and Siouxia became a part of an Eocene North American Continent, which was very similar in shape to the North America of today. Now Siouxia, the little continent that was so many times submerged, lies a mile or more above sea level as a part of the great plains of the western United States.

The sites of many of our great seaports have been under water several times during geologic history. In fact, New York, many million years ago, was a place on the western shore of Appalachia. Now Appalachia is no more and New York is on the eastern shore of North America. What will the future bring?

Geologists find that in some areas the land is rapidly emerging from the sea—sometimes as fast as one foot in fifty years. Other shore lines are sinking, at a comparatively fast rate. Does this indicate a change in the shape of our continent? If so, when will it happen?

Perhaps, within the next twenty thousand years, the slight changes now taking place, if continued, will make a change in shoreline that will show on a page-sized map.

What causes these changes? Geologists believe that the last ice age is responsible for many of them. When the ice covered the northern parts of all the continents in the northern hemisphere to a depth of perhaps a mile, the land sank under the weight, and the sea levels dropped as water was removed to make up the ice caps. Now, with most of the ice melted off, the sea levels have risen, and the land, freed from the weight of the ice, is slowly rising to its former position.

Ice Still Melts

There is still a small amount of ice remaining on earth. Perhaps it will melt away, some hundreds or thousands of years in the future. What will this do to our shoreline? Will the future see New York a great area of water, with the rusted remains of skyscrapers rising as menaces to navigation? Will St. Louis be the harbor at the mouth of the Mississippi? Perhaps, for a complete melting of all the remaining ice masses on earth would raise the sea level about 100 feet. Will this occur? Nobody knows. Our observations have only continued for about 100 years, and we can only reconstruct with certainty a few hundred years of detailed geologic history before that.

Probably the changes in sea level and shoreline will be partly offset by rising of the land as ice melts away. At any rate, the changes will be so slow that man will have nothing to fear from a sudden inundation. New York's penthouse dwellers need not keep lifeboats.

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Many biologists believe that land bridges once connected the various contients for a few million years, allowing various animals and plants to migrate from one continent to another. After the migration, the land bridges slowly sank, and development of animal and plant life on the various continents went on, each continent evolving its distinctive life forms from a common ancestry without further contact with the parent continent. Thus, the elephants evolved in ancestral Eurasia, and migrated to North America, while the horse probably originated in North America, and wandered over a now-vanished land bridge to Asia and later to Africa.

Vanished land bridges in the Bering Sea area may explain the coming of man to the American Continent. Perhaps he migrated along with the Mammoth and Mastodon, when Asia became overpopulated in some era of the remote past. Certainly, a land bridge from Asia to America, located in the Bering Sea area, is a more probable migration route for man than a lost continent of Mu, in the central Pacific, and a Bering Sea land bridge is geologically probable, while a continent of Mu can only be explained by theories that are not now accepted by the majority of geologists. Perhaps Atlantis, now regarded as a myth, will, in the not far distant future, again receive serious consideration. Soundings of the Atlantic basin recently checked by the most modern methods, show that a vast ridge runs down the center of the Atlantic, not very far under water, from near Iceland to the Falkland Islands, off the southern tip of South America. A very slight warping of the earth's crust would bring this ridge above the water, and another very slight warping, of only about 1/8000 of the earth's diameter, would plunge it into the ocean.

Anything May Happen

Would this produce the cataclysm described by Plato, when tremendous waves and volcanic eruptions overwhelmed the great kingdom of Atlantis? Geologists know that almost anything may happen, but most of them believe that the destruction of Atlantis was a product of Plato's fertile imagination, rather than the result of a warping of the earth's surface. Still, "telegraph ridge," as this subsea mountain range is called, remains unexplained. Is it the remains of the lost Atlantis, which is supposed to have vanished 11,000 years ago, or the submerged backbone of the vanished Atlantic Continent of more than 300,000,000 years ago?

Continents Growing

At present, our continental masses seem to be growing. North America today is made up of the joined fragments of the ancient continents of Cascadia, Canadia, Siouxia, Mexicoia, Antillia, Appalachia, and perhaps others which geologists haven't discovered yet. South America and the other continents are likewise made up of fragments of older land masses, which, after uncounted millions of years of independent existence, of growing, shrinking, submersion and reemergence from the sea, have joined together into our present lands. Will there be further joining of land masses, leading perhaps to the creation of one great continent? Nobody knows, but geologists don't believe so. The trend, according to present theories, has been toward a greater separation of the present land masses.

What will the distant future, of say 100,000,000 years hence, hold for our continents? Most land areas have at one time or another been under the sea, some of them several times. Will the cities of the far future be built on what is now sea bottom, and the ships of coming civilizations steam serenely over the site of our present Rocky Mountains? Time alone will tell.

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Science News Letter, November 20, 1937

Transvaal gold miners set an all-time record in July 1937 by producing more than 996,500 ounces of fine gold, outdistancing their previous record by 17,000 ounces.

Vienna has an "exhibition of forgeries" to show how fakers try to imitate antiquities such as old carvings and castings.

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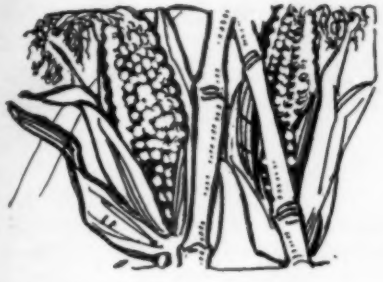
AGRICULTURE

NATURE RAMBLINGS
by Frank Thone



Agriculture Celebrates

THE U. S. Department of Agriculture this week celebrates the seventy-fifth anniversary of its founding. It came into existence during the stressful days of the Civil War, so that the first Secretary of Agriculture sat in the cabinet of President Lincoln.

From its very beginning, the Department has been an institution of research, its scientists seeking always for new facts, things, and above all for new basic principles, which may be applied through the workings of nature for the improvement of American living conditions.

A mere catalog of its accomplishments would take a thickish book, but a few sample highlights can serve to give an idea of the multiform and far-reaching importance which this department has come to have.

Defeating diseases in animals was an early triumph. Hog cholera has been checkmated, bovine tuberculosis is on the way out, rigid quarantine keeps hoof-and-mouth disease at bay beyond our borders.

One major medical principle, that insects and other small biting things can carry the germs of certain diseases, was first worked out as a veterinary problem in the U. S. Department of Agriculture. Its application to such scourges of humankind as malaria and yellow fever came later.

The earliest scientific work for agriculture, done long before there was a Department, was the importation of promising seeds and plants by Benjamin Franklin. The Department continues the tradition, searching everywhere for better crop plants and farm animals.

Improvement of what we have through Mendelian genetics is another major activity of Department of Agriculture scientists. This is something that lies very close to the heart of the present Secretary, for Henry Wallace's introduction of hybrid corn into large-scale cultivation while he was still an Iowa farmer-editor was in itself a revolutionary advance in American agriculture.

Science News Letter, November 20, 1937

●RADIO

No Program on Thursday, November 25, Thanksgiving Day.

December 2, 3:30 p. m., E.S.T.

KEEP WELL AT CHRISTMAS—Dr. John A. Skladowsky of the Baltimore Health Department.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

MEDICINE

Fight Against Heart Disease Chiefly Afflicting Children

WITH less than $30,000 a year the U. S. Public Health Service is trying to conquer a widespread, usually fatal and always costly heart ailment.

The ailment is rheumatic heart disease. It kills, according to estimates, between 25,000 and 30,000 persons every year. Nearly all of these victims are children or young men and women under 30 years of age. The death figures may be much higher and no one knows exactly how many children and young people throughout the country are living crippled, invalids' lives as a result of this heart ailment.

Heart disease of all forms causes about one-third of all deaths reported in the United States. The size of the problem and the fact that "not more than $1,000,000 is invested in permanent endowment" for research into the causes and prevention of heart disease is pointed out in *Fortune* (November)

The U. S. Public Health Service has limited its attack on this huge problem to rheumatic heart disease, the kind of heart ailment that strikes down little children and young men and women just starting their careers, because, as Dr. Arthur M. Stimson who is directing the studies explained, this kind of heart disease is the most important from the public health viewpoint.

For one thing, rheumatic heart disease, of all heart ailments, is most costly to the community. It is a long drawn-out malady, which means the cost of treatment and care is high. The victims are chiefly among the poor, which means the community must bear the cost. Death comes at an age, usually before 30 years, so young that the individual cannot make any return to society for the money spent on him.

Measures for prevention and treatment, if discovered, could be applied more successfully in childhood than at later ages.

Still another reason for starting the attack on heart disease with studies of rheumatic heart disease is that most other heart ailments, syphilitic heart disease or heart disease due to thyroid gland disorder, for example, are linked with another disease or else, as in arteriosclerosis, are on the borderline between disease and old age.

No answer to the problem of rheumatic heart disease has yet been found, Dr. Stimson said. The cause has been laid to infection with streptococci, or with a virus; to allergy or hypersensitiveness to germ poisons; to dietary lack; to poverty; to cold climate; to glandular disorders; and to disturbed metabolism. None of the theories has been proved correct. Without knowing the cause, treatment can only be to relieve pain and build up strength, and no preventive methods are available.

The problem is still in the fact-finding stage, and finding more and new facts about the disease is what the Public Health Service is at present trying to do. Dr. Stimson and associates at the National Institute of Health are mak-

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SEASICKNESS

ing, among other tests, laboratory studies of blood from rheumatic fever patients to see if they can find definite evidence of a germ cause.

In Philadelphia, Dr. O. H. Hedley of the U. S. Public Health Service is searching not for causes but for cases of the disease. Children's doctors and heart specialists realize the extent of the problem, but health officers and general medical practioners, Dr. Stimson said, have little or no conception of it.

The first step that must be taken is to make all medical men so aware of it that every case and every death due to rheumatic heart disease gets reported. Then the research scientists will have real facts to work from. They will know how many cases there are; how many patients die and how many survive; whether, as is strongly suspected, the disease occurs more often in cold than warm regions and more often among the poor than the rich; and whether it really is infectious, as is assumed.

Dr. Hedley has already accomplished part of this job. He has interested the health department and the doctors in Philadelphia to the point where they report rheumatic heart disease cases and deaths separately from other heart disease deaths. He has taken definite steps to have rheumatic heart disease listed by itself in the international list of causes of deaths. Finally, the U. S. Census Bureau has agreed to list this heart ailment under a separate classification.

Science News Letter, November 20, 1937

According to one theory, America's wonderful ancient Mayan civilization in the tropics was defeated by an unwise farming system and erosion.

British health regulations automatically provide treatment for men, women, and children afflicted with tuberculosis.

PUBLIC HEALTH

Predicts Ten Million Will Have Hospital Care Insurance

Hospital Association Approves Plan and Sets 7-Point Standards; Patients Appear to Benefit; No Losses

HOSPITAL care insurance will probably be carried by 10,000,000 persons, most of them in cities of the Atlantic seaboard and Ohio, by the year 1942, Dr. C. Rufus Rorem, director of the American Hospital Association's committee on hospital service, predicted at the meeting of the American College of Surgeons in Chicago.

The College of Surgeons has already gone on record as approving hospital care insurance as has the American Hospital Association. Dr. Rorem's report indicated that individual surgeons and physicians are satisfied with it as it is working out in various communities.

More than 1,250,000 persons are already placing hospital care in the family budget by making payments, of from 50 cents to 80 cents a month, into a common fund which is used to pay hospital bills for those requiring care. More than 50,000 persons have already received care under various non-profit hospital care plans and about 10,000 subscribers are now being admitted each month to participating hospitals. The most favored type of plan is that which includes care of the entire family, and which includes laboratory and X-ray diagnostic service and anesthesia as well as board and room service.

Expansion of these hospital service plans to include medical and surgical fees seems unlikely.

"If medical and surgical services are to be provided through group payment plans," Dr. Rorem observed, "such action must come through the initiative and cooperation of physicians and surgeons. Health insurance is not a probable outgrowth of the present type of hospital care insurance."

The American Hospital Association does not administer any group hospitalization plan, but in approving the principle, it established a 7-point standard for an acceptable plan. These points are: emphasis on public welfare; nonprofit sponsorship and control; limitation to hospital service; free choice of hospital and physician; support by medical profession and public; economic and actuarial soundness; and dignified promotion and administration.

What physicians think of the plan was learned by questioning some 2,000 who have attended subscribers to nonprofit, free-choice hospital service plans.

The relations between physician and patient were improved rather than disturbed, it appears from the answers Dr. Rorem quoted. Payment of physicians' fees was, on the whole, more prompt.

Patients were more willing to go to the hospital and to stay as long as their physicians thought advisable. A few malingerers, who stayed longer than necessary or than they might have if the bills had not been paid by the insurance, were found and it is apparent that this aspect of the situation will have to be watched.

The quality of medical and hospital service given insurance plan patients seems to have been as good as that given any other patient in the hospital. Fear that these patients might have been treated less well seems unjustified.

The soundness of the plans on the financial side was learned from the experience of a Syracuse, N. Y., hospital, which had to weather a large number of admissions due to an epidemic. The funds held up, however, and there was no deficit for the hospital to underwrite.

Science News Letter, November 20, 1937

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Reference Books

AMERICAN WOMEN: THE OFFICIAL WHO'S WHO AMONG THE WOMEN OF THE NATION. VOL. II: 1937-38—Durward Howes, ed.—*American Publications Inc.*, 826 p., $10. Since the first edition of this Women's Who's Who, of course much additional biographical material has been added, as well as hundreds of new names not before included. Geographical and occupational indices, a list of women's organizations and a statistical summary add to the value of the book, which includes nearly eight thousand biographies.

Science News Letter, November 20, 1937

Histology

A TEXTBOOK OF HISTOLOGY (7th ed.)—Harvey Ernest Jordan—*Appleton-Century*, 738 p., illus., $7.50.

Science News Letter, November 20, 1937

Science

OUR ENVIRONMENT: HOW WE USE AND CONTROL IT—George C. Wood and Harry A. Carpenter—*Allyn and Bacon*, 834 p., illus., $1.80. New edition of a high school text in general science that has gone through three printings in four years.

Science News Letter, November 20, 1937

Paleontology

A STUDY OF THE MIOCENE SIRENIAN DESMOSTYLUS—V. L. Vanderhoof—*Univ. of California*, 92 p., plates, $1. Detailed descriptive work of interest only to the professional paleontologist.

Science News Letter, November 20, 1937

Bibliography

BOOKS THAT HAVE SHAPED THE WORLD—Fred Eastman—*American Library Assn.*, 62 p., $1., 90 c. to Libraries. Annotated lists of the great books in biography, drama and other literature—two hundred in all. Brief introductory chapters invite reading, in a charming manner.

Science News Letter, November 20, 1937

Embryology

A TEXTBOOK OF EMBRYOLOGY—(3rd ed.)—Harvey Ernest Jordan and James Ernest Kindred—*Appleton-Century*, 613 p., illus., $7.

Science News Letter, November 20, 1937

Medicine

THE DIARY OF A SURGEON IN THE YEAR 1751-1752—John Knyveton; Ed. by Ernest Gray—*Appleton-Century Co.*, 322 p., $2.50. Although the picture this book gives of medical practice and education in the 18th century will be more appreciated by physicians than laymen, the lay reader will find much of general interest in this diary of a country boy who went to London to study medicine and subsequently had a most exciting career as surgeon's mate in the British Navy.

Science News Letter, November 20, 1937

Physical Education

PHYSICAL EDUCATION FOR THE CLASSROOM TEACHER—Dorothy LaSalle—*A. S. Barnes*, 209 p., illus., $2. This simply written, practical book should accomplish its aim of helping the class room teacher, trained by academic disciplines, to use physical education as one means of preparing the child to take his place in the world.

Science News Letter, November 20, 1937

Air-Conditioning

DEGREE-DAY HANDBOOK (2d ed.)—Clifford Strock and C. H. B. Hotchkiss—*Industrial Press*, 298 p., $3. A handbook for air conditioning engineers. Data and tables for checking heating plant operation and predicting fuel consumption.

Science News Letter, November 20, 1937

Geology

ECONOMIC GEOLOGY (7th ed.)—H. Ries—*Wiley*, 720 p., illus., $5. New facts and illustrations add to the value of this new edition of a work which has been standard in its field for a generation.

Science News Letter, November 20, 1937

Aeronautics

BOY'S BOOK OF FLYING—Charles Boff—*Dutton*, 240 p., $2. Mostly about British planes and British flying.

Science News Letter, November 20, 1937

Physics

THE FUNDAMENTAL PRINCIPLES OF QUANTUM MECHANICS—Edwin C. Kemble—*McGraw-Hill*, 611 p., $6. This book will aid research on the properties of matter or understanding recent attempts to create a relativistic form of quantum theory.

Science News Letter, November 20, 1937

Limnology

THE LIFE OF INLAND WATERS (3d ed.)—James G. Needham and J. T. Lloyd—*Comstock*, 438 p., $3. A most practical vade-mecum for the biologist interested in aquatic life attests past success and anticipates the future by going into its third edition.

Science News Letter, November 20, 1937

Science—Economics

BULLETIN OF THE COLONIAL INSTITUTE OF AMSTERDAM—Published in collaboration with the Netherlands Pacific Institute, Amsterdam, Vol. 1, No. 1. Quarterly, $4.50 a volume. A new bilingual journal (English and Dutch) dedicated to the task of making better known the problems and achievements of the Dutch in the Netherlands East Indies. Contributions concern both economics and science: this first issue contains a discussion of the budget of the Netherlands East Indies, a Statistical Abstract, an article on malaria in the Netherlands East Indies, one on social organization in Borneo, Celebes, and the Moluccas, etc.

Science News Letter, November 20, 1937

Meteorology

WEATHER—Gayle Pickwell—*Hugh F. Newman & Co., Los Angeles*, 170 p., plates, $3. A popular book about weather needs not only an adequate text (which this one has) but also plenty of pictures. This book was wisely made up with quite large pages (9 x 11½ inches) so that full-page half-tones (lots of them) really are something to look at.

Science News Letter, November 20, 1937

Physics

SCIENCE AND MUSIC—Sir James Jeans—*Macmillan*, 258 p., $2.75. See page 325.

Science News Letter, November 20, 1937

Agriculture

THE RESPONSE OF GOVERNMENT TO AGRICULTURE—Arthur P. Chew—*Govt. Print. Off.*, 108 p., 50 c. An account of the origin and development of the U. S. Department of Agriculture, on the occasion of its seventy-fifth anniversary. See page 333.

Science News Letter, November 20, 1937

OCCUPATIONAL GUIDANCE
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Additional Reviews On Page 335

Conservation, Juvenile

PATHS TO CONSERVATION—James S. Tippett—*Heath*, 299 p., 88 c. As conservationists place seeds and saplings where they want grasslands and forests to come back again, so wise educators plant ideas in minds as young as possible where they want to reap later harvests of effective civic action. This book, well planned, palatable to quite young minds, leads to appreciation of the value and necessity for conservation by steps easy but certain and lasting.

Science News Letter, November 20, 1937

Zoology, Juvenile

OUR TOWN AND CITY ANIMALS—Frances E. Clark and Katharine L. Keelor—*Heath*, 218 p., 76 c. The pets, work animals, park birds, zoological park inhabitants, etc., that a city child is likely to meet, presented in a style attractive to junior readers.

Science News Letter, November 20, 1937

Zoology, Juvenile

ON CHARLIE CLARK'S FARM—Katharine L. Keelor—*Heath*, 196 p., 72 c. The small hero of his book, Charlie, goes to live on the old home farm. His adventures there with domestic and wild animals serve as introduction for young readers making their first ventures into the field of animal study.

Science News Letter, November 20, 1937

Railroad History

PORTRAITS OF THE IRON HORSE: The American Locomotive in Picture and Story—Robert S. Henry, illus. by Otto Kuhler—*Rand McNally*, 80 p., $2. A beautifully produced history in picture and story of the most thrilling thing on the railroad: the steam locomotive. Make no mistake about it, the iron horse has had a thrilling past and has an important future. They're all here: from Peter Cooper's Tom Thumb to the giant streamlined steam units of today.

Science News Letter, November 20, 1937

Engineering

AIR CONDITIONING MANUAL—*Domestic Engineering Co.*, 238 p., charts, $3. For the air conditioning technician. Much of the material is presented in strikingly legible blueprint form.

Science News Letter, November 20, 1937

Astronomy

INTRODUCING THE CONSTELLATIONS—Robert H. Baker—*Viking Press*, 205 p., $2.50. The University of Illinois' professor of astronomy tells something of the skies for the benefit of the layman who is curious to know the names of the stars. Charts and photographs plus some historical notes are worked into the text.

Science News Letter, November 20, 1937

Mathematics

CARL FRIEDRICH GAUSS—G. Waldo Dunnington, Trans. and Ed.—*Louisiana State Univ.*, 91 p., $1. This volume contains translations of several of the lesser known works of Gauss, ranked with Laplace and Lagrange as one of the three modern masters of mathematics. His inaugural lecture as director of the University of Goettingen Observatory and a brief account of his early life are included.

Science News Letter, November 20, 1937

Mathematics

SOCIALIZED GENERAL MATHEMATICS—Walter W. Hart and Cottell Gregory—*Heath*, 406 p., $1.28. Intended to teach quantitative thinking about socially useful material, especially for high school students who are not taking the customary mathematics work in the early years of their course.

Science News Letter, November 20, 1937

Chemistry

GENERAL CHEMISTRY FOR COLLEGES (Rev.)—B. Smith Hopkins—*Heath*, 758 p., $3.72. For use in the intensive introductory college chemistry course that presupposes a year of high school chemistry.

Science News Letter, November 20, 1937

Mathematics

TEACHING ARITHMETIC IN THE ELEMENTARY SCHOOL. Vol. 1, Primary Grades—Robert Lee Morton—*Silver Burdett*, 410 p., $2.40. A rewriting of the author's "Teaching Arithmetic in the Primary Grades," first published ten years ago.

Science News Letter, November 20, 1937

Natural History

NATURE STUDIES—L. D. Wooster—*Swift, obtainable through The R. S. Markwell Bookstores, Hays, Kansas*, 115 p., $1. A small book, planographed, spiral-bound, for the younger investigators of natural history.

Science News Letter, November 20, 1937

Zoology

THE MORPHOLOGY, DIVISION AND CONJUGATION OF THE SALT-MARSH CILIATE FABREA SALINA HENNEGUY—John Marshall Ellis—*Univ. of California Press*, 46 p., illus., 75 c.

Science News Letter, November 20, 1937

Science

ANNUAL REPORT OF THE BOARD OF REGENTS OF THE SMITHSONIAN INSTITUTION SHOWING THE OPERATIONS, EXPENDITURES, AND CONDITION OF THE INSTITUTION FOR THE YEAR ENDED JUNE 30, 1936—*Govt. Print. Off.*, 446 p., illus., $1.50. This record of another year's progress in one of America's oldest and most comprehensive scientific institutions includes 23 highly interesting articles on subjects ranging all the way from the size and age of the Universe by Sir James Jeans to the habits of the vampire bat by Dr. Raymond L. Ditmars.

Science News Letter, November 20, 1937

Genetics

GENETICS AND THE ORIGIN OF SPECIES—Theodosius Dobzhansky—*Columbia Univ.*, 364 p., $3.60. One of the most thorough-going and best organized treatises on genetics as it applies to the problems of evolution that has yet appeared. A special advantage enjoyed by the author, which he passes on to his readers, is his full familiarity with the important work in genetics now going on in the USSR.

Science News Letter, November 20, 1937

Botany

BRITISH STEM- AND LEAF-FUNGI (COELOMYCETES). VOL. II.—W. B. Grove—*Cambridge (Macmillan)*, 407 p., $6. The second and completing volume of a comprehensive British work in mycology; the appearance of the first volume was noticed in SNL for Sept. 21, 1935.

Science News Letter, November 20, 1937

Pathology

CYTOLOGICAL VARIATIONS IN THE BLOOD AND BLOOD-FORMING ORGANS OF WHITE-FOOTED MICE EXPERIMENTALLY INFECTED WITH TRYPANOSOMA CRUZI—Sherwin F. Wood—*Univ. of California Press*, 21 p., illus., 50 c.

Science News Letter, November 20, 1937

Zoology

MORPHOLOGY OF THE POCKET GOPHER MAMMALIAN GENUS THOMOMYS—John Eric Hill—*Univ. of California Press*, 93 p., $1.

Science News Letter, November 20, 1937

Chemistry

ELEMENTARY EXPERIMENTAL CHEMISTRY—John C. Hogg and Charles L. Bickel—*Oxford Univ.*, 288 p., $2. Laboratory work for the high school student.

Science News Letter, November 20, 1937